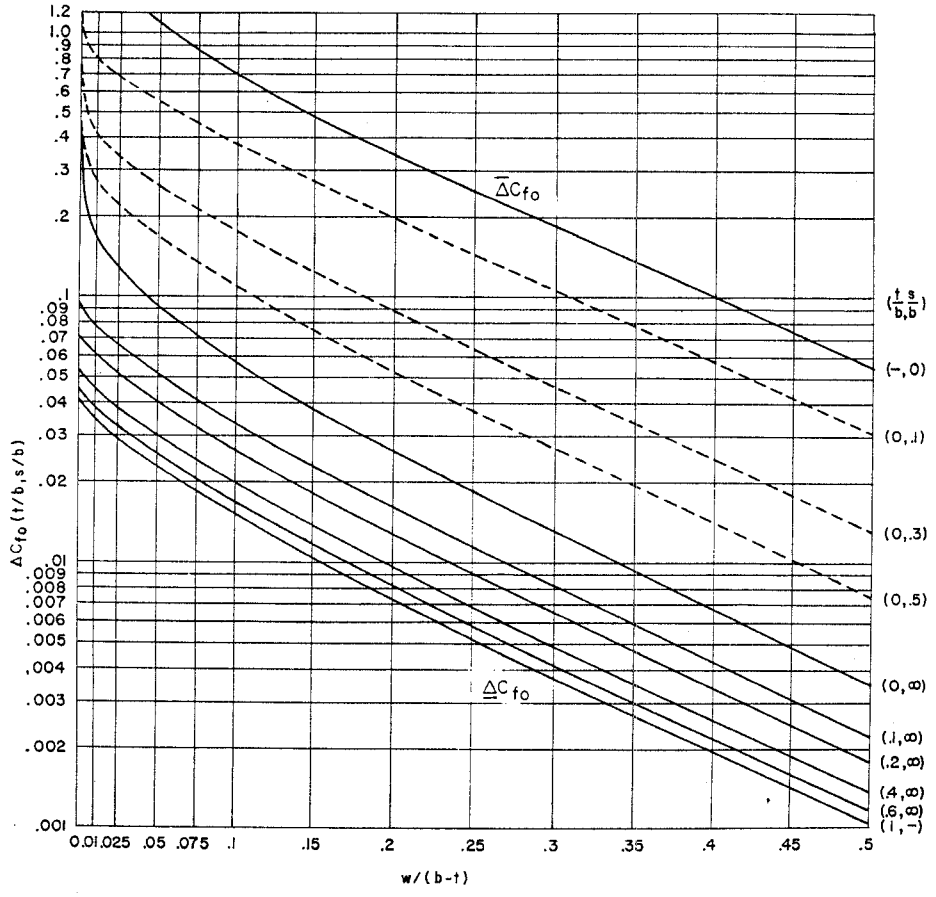


Fig. 2. A universal diagram for ΔC_{fo}.

racy because it plots directly the difference between nearly equal quantities; 3) it includes the limiting cases $t/b = 1$ and $s/b = 0$; 4) two points on each interpolated curve instead of one are known; and 5) the curves of the figure are substantially parallel and straight.

REFERENCES

[1] W. J. Getsinger, "Coupled rectangular bars between parallel plates," *IRE Trans. Microwave Theory Tech.*, vol. MTT-10, pp. 65–72, Jan. 1962.
[2] H. J. Riblet, "The limiting value of the interaction between symmetrical fringing capacitances," *IEEE Trans. Microwave Theory Tech.* (Short Papers), vol. MTT-21, pp. 644–647, Oct. 1973.
[3] R. H. T. Bates, "The characteristic impedance of shielded slab line," *IRE Trans. Microwave Theory Tech.*, vol. MTT-4, pp. 28–33, Jan. 1956.
[4] F. Oberhettinger and W. Magnus, *Anwendung der Elliptischen Funktionen in Physik und Technik*. Berlin: Springer, 1949.
[5] H. J. Riblet, "The exact dimensions of a family of rectangular coaxial lines with given impedance," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-20, pp. 538–541, Aug. 1972.
[6] S. Bergmann, "Über die Berechnung des Magnetisches Feld in einem Einphasen-Transformator," *Z. Agnew Math. Mech.*, vol. 5, pp. 319–331, 1925.
[7] R. Pregla, "Distributed capacitances for coupled rectangular bars of finite width," *Arch. Elec. Übertragung*, vol. 12, pp. 69–72, 1971.

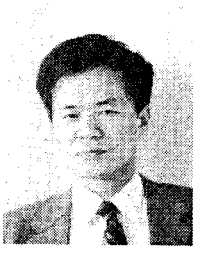
Contributors

Lawrence E. Dickens (A'56–M'59–SM'69) was born in North Kingstown, R. I., on December 8, 1932. He received the B.S. and M.S. degrees in engineering and the D.Eng. degree in 1960, 1962, and 1964, respectively, from The Johns Hopkins University, Baltimore, Md.

After his military service (1950–1953), he joined Bendix Radio, Field Engineering, Baltimore, Md. In 1956 he transferred to the Department of Research and Development (Radar) at Bendix Radio where he worked on vacuum tube, transistor, tunnel diode, and parametric (reactance) amplifiers. From 1960 to 1965 he worked at the Carlyle Barton Laboratory of The Johns Hopkins University where he was engaged in the investigations of circuits and materials with the general objective of improving microwave and millimeter-wave receiving systems. From 1965 to 1969 he was on the staff of the Advanced Technology Corporation, Timonium, Md., where he was engaged in the development of semiconductor components and the RF and millimeter-wave circuits for their utilization. In 1969 he joined the staff at Westinghouse Electric Corporation, Systems Development Division, Advanced Technology Laboratories, as an Advisory Engineer where he has been engaged in the development of microwave solid-state devices,

RF, microwave, and millimeter-wave circuitry, microwave integrated circuits, and the general development of new low-noise receiver techniques.

★



Shunichiro Egami (M'69) was born in Kurume City, Fukuoka, Japan, on September 5, 1941. He received the B.S. and M.S. degrees from the University of Kyushu, Fukuoka, Japan, in 1964 and 1966, respectively.

In 1966 he joined the Electrical Communication Laboratories, Nippon Telegraph and Telephone Public Corporation, Yokosuka-shi, Japan. During his first three years there he worked on the development of the low-noise mixers and microwave integrated circuit for the 7-GHz long haul and 11-GHz short haul radio relay system. From 1969 to 1972 he worked on the design of 20-GHz wide-band parametric amplifiers. Now he is engaged in the evaluation of the earth station built for the lower millimeter-wave satellite communication.

★

Joseph Helszajn (M'64) was born in Brussels, Belgium, in 1934. He received the Full Technological Certificate of the City and Guilds of London Institute from Northern Polytechnic, London, England, in 1955, the M.S.E.E. degree from the University of Santa Clara, Santa Clara, Calif., in 1964, and the Ph.D. degree from the University of Leeds, Leeds, England, in 1969.

He has held a number of positions in the microwave industry. From 1964 to 1966 he was Product Line Manager at Microwave Associates, Inc., Burlington, Mass. Currently, he is working as a consultant. He is also a Senior Research Fellow at Heriot-Watt University, Edinburgh, Scotland. He is the author of the books *Principles of Microwave Ferrite Engineering* (N. Y.: Wiley) and *Nonreciprocal Microwave Junctions and Circulators* (N. Y.: Wiley, 1975).

Dr. Helszajn is a fellow of the Institution of Electronic and Radio Engineers (England). In 1968 he was awarded the Insignia Award of the City and Guilds of London Institute.

★

Seiko Kitazawa was born in Koshoku City, Nagano, Japan, on December 8, 1948. She received the B.S. degree from Ochanomizu University, Tokyo, Japan, in 1971.

Since 1971 she has been a Research Assistant in the Department of Electronic Engineering, University of Tokyo, where she is engaged in investigations on microwave planar circuits and the soft-landing electron collectors for beam-type microwave tubes.

Miss Kitazawa is a member of the Institute of Electronics and Communication Engineers of Japan.

★

Douglas W. Maki (M'69) was born in Detroit, Mich., on November 15, 1945. He received the B.S. degree in physics from Michigan Technological University, Houghton, in 1967, and the M.S. degree in electrical engineering from the University of Maryland, College Park, in 1974.

He joined Westinghouse Electric Corporation in 1967 and is currently a Senior Engineer in the Systems Development Division where he works on the computer-aided design of microwave integrated circuits.

Takanori Okoshi (S'56–M'60) was born in Tokyo, Japan, on September 16, 1932. He received the B.S., M.S., and Ph.D. degrees in electrical engineering, all from the University of Tokyo, Tokyo, Japan, in 1955, 1957, and 1960, respectively.

In 1960 he was appointed an Instructor, and in 1961 became an Associate Professor in the Department of Electronic Engineering, University of Tokyo, where he worked primarily in the field of microwave circuits, microwave measurements, and microwave electron devices. From 1963 through 1964, on leave of absence from the University of Tokyo, he joined Bell Telephone Laboratories, Murray Hill, N. J., where he was engaged in research on electron guns. He returned to the University of Tokyo in 1964 and since then he has been working again in the microwave field, specializing in solid-state microwave oscillators, microwave planar (two-dimensional) circuit, and collectors for beam-type tubes. In 1971 he joined the Technical University of Munich on a temporary basis as a Guest Professor. Since 1968 he is also engaged in the research of three-dimensional imaging, and most recently, of optical waveguides. He is an Associate Editor of the *Transactions of the Institute of Electronics and Communication Engineers of Japan* and of the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES.

★

Martin V. Schneider (M'56–SM'71) was born in Bern, Switzerland, on October 20, 1930. He received the Diploma in physics and the Doctorate in natural sciences from the Swiss Federal Institute of Technology, Zurich, Switzerland, in 1956 and 1959, respectively.

From 1959 to 1961 he was a Research Assistant at the Swiss Federal Institute of Technology, and in 1961 he joined the Radio Research Laboratory at Bell Laboratories, in Holmdel, N. J. He has worked on thin-film solid-state devices and circuits, Schottky-barrier photodetectors, and microwave and millimeter-wave integrated circuits. He is currently engaged in advanced work on millimeter-wave devices and circuits for use in communication receivers and transmitters in the 100–300-GHz frequency range.

Dr. Schneider is a member of the American Physical Society, he is the MTT Group Chapter Chairman of the New Jersey Coast Section IEEE, and a member of the Editorial Board of MTT.

★

William W. Snell, Jr., was born in Williamsport, Pa., on July 3, 1932. He graduated from the Williamsport Technical Institute in 1951.

He joined Bell Laboratories, Holmdel, N. J., in 1955. He has worked on the design of waveguide components for use in the 4-, 6-, and 11-GHz common-carrier band. He also participated in the early stages of satellite communications and designed several components of the Holmdel Space Communication Receiver. He is currently working on thin-film millimeter-wave devices and circuits for use in communication receivers and transmitters at 30 GHz and 60 GHz.

★

Francis C. Tan was born in Sabah, Malaysia, on September 29, 1949. He received the B.Sc. degree in electrical and electronic engineering from Heriot-Watt University, Edinburgh, Scotland, in 1972. Currently, he is engaged in research toward the Ph.D. degree at Heriot-Watt University on the university scholarship.